

Claims:

1. A viewing port for a process chamber, comprising:
a viewing window to permit optical access to said process chamber;
a mounting to couple said viewing window to said process chamber; and
a viewing window cleaning apparatus coupled to said mounting and disposed between said viewing window and said process chamber, and configured to form a cleaning plasma in a cleaning plasma region of said mounting.
2. The viewing port as recited in claim 1, wherein said viewing window cleaning apparatus comprises a RF source and a plasma source.
3. The viewing port as recited in claim 2, wherein said viewing window cleaning apparatus further comprises an impedance match assembly and a plasma generator.
4. The viewing port as recited in claim 3, wherein said plasma generator comprises an inductive coil.
5. The mounting as recited in claim 1, further comprising at least one array of magnets coupled to said mounting.
6. The mounting as claimed in claim 5, wherein at least one of said magnets of the array comprises a permanent magnet.
7. The mounting as claimed in claim 7, wherein at least one of said magnets of the

array comprises an electromagnet.

8. The mounting as recited in claim 1, further comprising a gas injection system coupled to said cleaning plasma region.

9. The mounting as recited in claim 8, wherein said cleaning plasma etches by-products deposited on said viewing window through physical etching.

10. The mounting as recited in claim 9, wherein said gas injection system provides at least one of argon, krypton, and xenon.

11. The mounting as recited in claim 8, wherein said cleaning plasma etches by-products deposited on said viewing window through chemical etching.

12. The mounting as recited in claim 11, wherein said gas injection system provides at least one of NF_3 , CF_4 , SF_6 , C_2F_6 , CCl_4 , and C_2Cl_6 .

13. The mounting as recited in claim 8, wherein said cleaning plasma etches by-products deposited on said viewing window through physical and chemical etching.

14. The mounting as recited in claim 13, wherein said gas injection system provides at least one of argon, krypton, xenon and at least one of NF_3 , CF_3 , SF_6 , C_2F_9 , CCl_4 , and C_2Cl_6 .

15. The mounting as recited in claim 1, comprising a viewing window supporting

section configured to position said viewing window at a predetermined position relative to a position of the process chamber.

16. The mounting as recited in claim 15, wherein the predetermined position is selected so that a substantial amount of by-products do not travel to said viewing window.

17. The mounting port as recited in claim 8, wherein said gas injection system is configured to flow a gas into the cleaning plasma region so that a pressure is generated in the cleaning plasma region, the pressure substantially opposing a propagating direction of by-products.

18. The mounting as recited in claim 8, further comprising at least one array of magnets coupled to said mounting.

19. The mounting as claimed in claim 18, wherein at least one of said magnets of the array comprises a permanent magnet.

20. The mounting as claimed in claim 18, wherein at least one of said magnets of the array comprises an electromagnet.

21. An improved process chamber, the improvement comprising a viewing port coupled to said process chamber, wherein said viewing port comprises:

a viewing window to permit optical access to said process chamber;

a mounting to couple said viewing window to said process chamber; and

a viewing window cleaning apparatus coupled to said mounting and disposed between said viewing window and said process chamber, and configured to form a cleaning plasma in a cleaning plasma region of said mounting.

22. The improved process chamber as recited in claim 21, wherein said mounting further comprises a gas injection system coupled to said cleaning plasma region.

23. The improved process chamber as recited in claim 21, wherein said viewing window cleaning apparatus comprises a RF source.

24. The improved process chamber as recited in claim 21, wherein said viewing window cleaning apparatus comprises a plasma generator.

25. The improved process chamber as recited in claim 21, wherein said mounting further comprises at least one array of magnets coupled to said mounting.

26. The improved process chamber as claimed in claim 25, wherein at least one of said magnets of the array comprises a permanent magnet.

27. The improved process chamber as claimed in claim 25, wherein at least one of said magnets of the array comprises an electromagnet.

28. A method of cleaning a viewing window for a process chamber, said method comprising:

providing a viewing window cleaning apparatus disposed between said viewing window and said process chamber; wherein said viewing window cleaning apparatus is configured to form a cleaning plasma; and

forming said cleaning plasma in the region between said viewing window and said process chamber to facilitate cleaning of said viewing window.

29. The method as recited in claim 28, wherein the method further comprises generating a magnetic field to prevent cross-field electron transport between said plasma chamber and said viewing window.

30. The method as recited in claim 28, wherein the method further comprises providing a gas so that a pressure is generated in the region between said viewing window and said process chamber, the pressure substantially opposing a propagating direction of by-products from said process chamber.

31. The method as recited in claim 28, wherein the method further comprises positioning said viewing window at a predetermined position relative to a position of the process chamber, wherein the predetermined position is selected so that a substantial amount of by-products do not travel to said viewing window.

32. The method as recited in claim 28, wherein said cleaning plasma is formed using a RF source and a plasma generator.

33. The method as recited in claim 28, wherein said cleaning plasma etches by-

products deposited on said viewing window using at least one of argon, krypton, xenon, NF_3 , CF_4 , SF_6 , C_2F_6 , CCl_4 , and C_2Cl_6 .